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# THE AMERICAN MATHEMATICAL MONTHLY

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## RETROSPECT AND PROSPECT.

By H. E. SLAUGHT, University of Chicago.

During the year just closed the Editors of the MONTHLY have endeavored to make this journal occupy a unique position in this country. How well they have succeeded is not for them to say. However, it may be helpful to all concerned to review the situation briefly and to consider our plans for the coming year.

**What we have tried not to do.** We have tried not to encroach in any way upon the well-defined field of our excellent secondary school journals of mathematics. We have not explicitly considered secondary school problems or policies. We have not dwelt upon pedagogical matters pertaining directly to secondary mathematics. Nevertheless, it is by no means true that we are without interest in the secondary field. On the contrary, we have an interest that is far deeper than the mere formulation and discussion of committee reports or of pedagogical theories. We believe that the *teachers themselves* are by far the most important factor in any educational scheme, and that unless these teachers, at least those who are responsible for planning and directing the work, have sources of inspiration and power outside of themselves and independent of their daily routine, then the best of plans and of pedagogical rules of procedure will accomplish but little in actual practice. We conceive that the MONTHLY has a mission to perform in helping to supply such inspiration and power to those high school teachers who can be brought within the sphere of its influence. On this point see the remarks by T. G. Rodgers on page 32 of this issue, and also the recent action of California teachers of mathematics reported on page 36.

On the other hand we have tried not to encroach upon the field of the advanced scientific journals of mathematics. We have refrained from publishing articles of a highly specialized character, and indeed in all articles involving technical terms or discussions we have tried to insist upon such explanations and illustrations as would render the context intelligible to the average reader of fair attainment in the ordinary courses of college mathematics, including calculus, taken by

candidates for the Bachelor's degree. Nevertheless, it is by no means true that we are without interest in the higher, technical, mathematical field. On the contrary, we have an interest that is far more vital than the mere supplying of technical papers which can be read only by specialists. We believe that large numbers who would become active and effective in higher mathematical research are now lost to the cause simply by reason of the fact that there are no intermediate steps up which they can climb to these heights. We believe that the MONTHLY has a mission to perform in holding the interest of such persons by providing mathematical literature of a stimulating character that is within their range of comprehension, and by offering an appropriate medium for the publication of worthy papers which the more ambitious among them may produce.

**What we have tried to do.** Having in mind the principles stated above we have during 1913 supplied 325 pages of matter, exclusive of the index to Volume XX, distributed as follows: papers involving subjects of historical interest, 87 pages; papers involving general information concerning the progress of mathematics, such as meetings of associations, book reviews, notes and news, 57 pages; topics involving pedagogical considerations, especially with regard to subject matter, 37 pages; papers involving a minimum of mathematical technicalities and dealing with topics of wide interest, 56 pages; papers of a somewhat more technical character in which, however, we have tried to have the technical terms explained for the benefit of the general reader, 38 pages; problems proposed and solved and miscellaneous questions involving difficulties actually encountered by our readers, 50 pages. We have thus tried to maintain an appropriate balancing of matter so as to conserve the interests of all our readers.

**What we desire to do during the coming year.** During 1914 it will be our endeavor to maintain the standards already established and to improve upon the past in every way possible. In order to do this we need the coöperation and constructive criticism of all our friends. For example, a certain reader whose opinion is greatly appreciated thinks that we should have more papers on topics in applied mathematics, and he immediately backs up his opinion by sending us a contribution which will appear in the March issue. That is what we mean by *coöperation*. The editors have no possible interest in this undertaking which should not appeal directly to every one who is really concerned for the development of mathematics in this country. Their responsibilities and burdens are self-imposed and without emolument, save for the satisfaction which may accrue from aiding in a cause in which they heartily believe. It is their ambition to make the MONTHLY render genuine service to every teacher of courses in college mathematics in this country, whether in academy, high school, normal school, college, or university; to stimulate to higher endeavor every student of mathematics, whether in school or not, who may be attracted by the papers, problems, questions or discussions published in the MONTHLY; and to win and hold the coöperation of all who can in any department render assistance in carrying out these plans. In particular, every one who reads these lines may at once give important assistance by bringing the MONTHLY to the attention of those who

may not know about it. The subscription list was doubled in 1913. If it should be doubled again in 1914, the journal would become self-sustaining. **It can be done.**

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## THE TACTICAL PROBLEM OF STEINER.

By W. H. BUSSEY, University of Minnesota.

NOTE BY THE EDITORS.—This article illustrates the reference in the editorial of this issue concerning “papers of a somewhat more technical character in which, however, we have tried to have the technical terms explained for the benefit of the general reader.” Professor Bussey has met this request most admirably.

The study of tactical configurations known as triple systems had its origin in two related problems proposed independently by T. P. Kirkman<sup>1</sup> and J. Steiner.<sup>2</sup> Kirkman’s problem is to arrange fifteen school girls in parties of three for seven consecutive days’ walk so that every two of the girls walk together once and only once during the seven days. There is a good account of the history of the problem with several methods of solution in Ball’s *Mathematical Recreations and Essays*, 5th edition, Chapter 9.

An arrangement of a number of elements in sets of three so that every set of two is contained in one and only one set of three is called a triple system. The sets of three are called triples or triads. The problem of the fifteen school girls involves a triple system of 15 elements and 35 triads. The simplest triple system is the following well-known one of 7 elements and 7 triads. The digits 0, 1, 2, 3, 4, 5, 6 are the elements and the columns are the triads.

0	1	2	3	4	5	6
1	2	3	4	5	6	0
3	4	5	6	0	1	2

The seven elements of this triple system can be arranged in sets of four, called tetrads, so that no triad is contained in a tetrad and so that every set of three which is not a triad is contained in one and only one tetrad. The arrangement is as follows.

0	1	2	3	4	5	6
1	2	3	4	5	6	0
2	3	4	5	6	0	1
5	6	0	1	2	3	4

It is well known that the nine points of inflexion of a plane cubic curve lie by threes on twelve straight lines. Four lines pass through each point of inflexion. Any two of the nine points thus determine a third, and the nine points form a

<sup>1</sup> *The Lady’s and Gentleman’s Diary*, 1850.

<sup>2</sup> *Journal für die reine und angewandte Mathematik*, Vol. 45, pp. 181–182.